



INTERNAL  
CORRESPONDENCE

Change title so it refers to Tonawanda  
and mortality study only  
Separate protocol for metals  
Neg-Pos Findings Section 'study should  
be continued' - limited life of  
Task Force

UNION CARBIDE CORPORATION 270 PARK AVENUE NEW YORK, N.Y. 10017

For information: Mr. C. R. Allenbach  
Distribution: Mr. R. L. Baker  
Location: Mr. L. E. Barron  
Mr. L. J. Berolatti  
Mr. J. B. Browning  
Mr. J. R. Clark  
Mr. R. W. Degenhart  
Mr. E. C. DeKay  
Mr. R. L. Doan  
Mr. R. L. Folkman  
Mr. V. P. Hayes  
Mr. R. J. Klotzbach  
Dr. T. A. Lincoln  
✓ Dr. M. J. Makowsky  
Mr. E. W. Van Den Ameele

Date

February 27, 1981

Department

HS & EA - Epidemiology

Medical Dept  
Chicago  
June 23, 1981

Redraft for Linde only  
? metals involvement  
No morbidity - (option)  
Mortality  
Should be continued - no  
decision as to decision  
of 5/8/81

Get a copy of med letter to M.D.  
and Nurses

Attached is a draft proposal for the epidemiology  
studies at Linde-Tonawanda and Metals-Niagara Falls plants.  
This represents Corporate Epidemiology's recommended approach.  
We would appreciate any comments you may have.

Very truly yours,

Susan G. Austin  
Susan G. Austin

H. M. D. Utidjian  
H. M. D. Utidjian

SGA/HMDU:lm  
Attachment

UCCNHT0000126

D R A F T

*? morbidity also*

A MORTALITY STUDY OF UNION CARBIDE EMPLOYEES AT TWO PLANTS

IN WESTERN NEW YORK STATE: A PROPOSAL

*and uranium tetrafluoride*

I. BACKGROUND

*what became known as the ceramic plant*

The Linde Division of Union Carbide Corporation (UCC) became involved with the Manhattan Project in 1942 when a contract was signed with the U. S. government to operate a "ceramics plant" in Tonawanda, New York to produce uranium oxide from ore - the first step in the production of the atomic bomb. Production started in September of 1943 and continued until July of 1946. In August of 1947 a second contract was signed for production of uranium tetrafluoride. The second phase of work ended in July of 1949. Throughout this entire period, conversion of uranium tetrafluoride to uranium metal was carried out at the Niagara Falls plant of UCC's Metals Division. Although all radioactive materials were removed and all buildings decontaminated, some low levels of radioactivity remained. However, a 1976-78 survey conducted by the Energy Research and Development Administration, a conclusion was reached that the amount of residual contamination from these operations was so low as to pose "no hazard for people working in this area".

*1) today by the State of New York to be discharged into public waters, including waters used as drinking H<sub>2</sub>O supplies.*

In January of 1980 a New York State Commission to investigate hazardous wastes cited its concern with the disposal in on-site wells at Tonawanda of 37 million gallons of liquid waste resulting from the production of uranium oxide during 1944-46. Subsequently reports have been found indicating that the uranium oxide content in the liquid waste resulting from the uranium oxide production was below levels permitted <sup>for drinking water even today</sup>. However, sufficient concern was generated by the New York State Commission's report to launch an internally sponsored mortality study of all employees who have worked at the Linde-Tonawanda and Metals-Niagara Falls sites, as well as a morbidity study of the employees directly involved in the Manhattan Project. It is anticipated that the conduct of these studies will provide a (definitive) assessment of any possible health hazards to employees at these plants resulting from UCC's involvement in the Manhattan Project.

*on the Manhattan Project*

II. PURPOSE OF STUDY

*2 mos*

The purpose of this study will be [twofold: (1)] to analyze the mortality experience of the work force at two Union Carbide plants from 1937 to 1980 to determine whether any specific occupational health hazards can be identified, and (2) to examine the mortality and morbidity experience of a small subset of UCC employees at these plants who were directly involved in the Manhattan project. ]

*morbidity will be deleted from balance*

UCCNHT0000127

A MORTALITY STUDY OF UNION CARBIDE  
EMPLOYEES AT TWO PLANT LOCATIONS  
IN NEW YORK STATE

Page 2

Particular attention will be focused on the relationship between occupationally-related radiation exposure resulting from the Manhattan Project and incidence of specific diseases such as malignant neoplasms, anemias and chronic kidney disorders.

III. METHODS

The type of study which will be conducted is termed a historical prospective cohort (population) study. Methods to be used fall into six categories:

1. Identification of Cohort

All employees of Union Carbide's Linde-Tonawanda and Metals-Niagara Falls plants between January 1937 and December 1980 will be included in the mortality study group. A subcohort of approximately 500 Manhattan project workers will be separately identified for the morbidity study.

2. Data Collection

- A. Personal, demographic, work history (including job titles) and mortality information will be gathered from employee records and coded onto study coding forms. (Attachment A).
- B. Comprehensive plant production histories with dates, department names and codes and process descriptions will be compiled for each plant.
- C. Last known address will be collected for the subcohort of Manhattan project employees.

3. Computerization

Data will be computerized and edited for accuracy and reliability.

4. Social Security Search

Social Security records will be searched to identify vital status (i.e., living or deceased) of all employees in study. In addition, Social Security records should indicate the approximate date and location of death for all deceased employees.

## D R A F T

### A MORTALITY STUDY OF UNION CARBIDE EMPLOYEES AT TWO PLANT LOCATIONS IN NEW YORK STATE

Page 3

#### 5. Acquisition of Death Certificates

State Departments of Vital Statistics will be contacted to request copies of death certificates for all deceased employees. (Some may already be available in Corporate Epidemiology files). These will be submitted to a qualified nosologist for coding and determination of the underlying cause of death.

#### 6. Morbidity Questionnaires

A cover letter explaining the purpose of the study will be sent to all former Manhattan project employees still alive. These employees will be asked to provide information regarding their employment and health histories (Attachment B) and to sign a consent form for permission to review their medical records.

### IV. ANALYSIS

Comparison of mortality and morbidity from specific diseases (e.g., malignant neoplasms, anemia and chronic nephritis) will be made between UCC employees and the general U. S. population.

If any excess is found among UCC employees, regional comparisons will be made since Western New York State is known to have higher incidences of some types of cancer, <sup>and other diseases</sup> than the general U. S. population.

Specific hypotheses will be tested:

1. UCC (Linde-Tonawanda and Metals-Niagara Falls) employees have a mortality experience comparable to that of the U. S. population when examined by age, sex, race, year of employment, type of job and departmental assignment (or work area);
2. There is no statistically significant association between occupational exposure to radiation (at the relatively low levels present in the Linde-Tonawanda and Metals-Niagara Falls plant) and mortality or incidence of malignant neoplasms or other specified diseases.

### MORTALITY

Analyses will be based on comparison of observed and expected numbers of deaths among the UCC study cohort. The expected number of deaths will be computed by applying age, sex, race, cause and year specific mortality rates

UCCNHT0000129

A MORTALITY STUDY OF UNION CARBIDE  
EMPLOYEES AT TWO PLANT LOCATIONS  
IN NEW YORK STATE

Page 4

in the general population to the "person years at risk" experienced by members of the UCC study cohort. The computer program developed by Richard Monson of Harvard University will be used to generate the expected numbers. "Person years at risk" will begin accumulating on the date an employee began working at one of the two plant locations and will terminate on the date of death or the date last observed alive. The cut off date for this study will depend on the availability of Social Security information.

#### MORBIDITY

The expected incidence of malignant neoplasms among the Manhattan project workers will be determined using the incidence rates published by the National Cancer Institute. Morbidity from non-malignant and non-fatal conditions will be compared with appropriate reference rates. Expected incidence will be compared with the observed incidence of diseases among these workers and a statistical determination will be made regarding the presence or absence of a meaningful (i.e., 50% - 100 % ) excess.

#### V. IMPLICATIONS

##### 1. Negative Findings

A "negative finding" implies either no apparent excess of mortality or disease incidence or an apparent but statistically insignificant excess of a particular disease in the study group compared with the reference group. If there is no apparent excess of any disease in the UCC cohorts, it will be safe to conclude that there is no current evidence of any health risk associated with plant employment. If an apparent but statistically insignificant excess of disease is found in the study group, it is possible that a real excess does exist but could not be detected in the present study due to small numbers and insufficient follow-up time. In either case, this study ~~should~~ <sup>will</sup> be continued.

##### 2. Positive Findings

A "positive finding" implies that both an apparent and a statistically significant excess of mortality or incidence of some disease is found in the study group. Further analyses of the data will reveal whether the excess is likely to be attributable to the workplace or whether other non-occupational factors such as diet, ethnicity or other employment could account for the differences observed between the study and comparison groups. In either case, the study ~~should~~ <sup>will</sup> be continued. *and possibly expanded.*

D R A F T

A MORTALITY STUDY OF UNION CARBIDE  
EMPLOYEES AT TWO PLANT LOCATIONS  
IN NEW YORK STATE

Page 5

IV. PEER REVIEW

The study protocol, its progress and all interim and final reports will be reviewed and approved by an independent peer review panel of outside experts in the field of occupational epidemiology. Not more than three qualified persons will be chosen for this task.

SGA  
sar  
February 24, 1981

UCCNHT0000131

## PERSONAL DATA

UNION CARBIDE WORK HISTORY

SOCIAL SECURITY NUMBER									LAST NAME									FIRST NAME									MIDDLE INIT	SS NO DISC IND	SS NO CHANGE IND	SEX	RACE	DATE OF BIRTH			BIRTH DATE EST	DATE FIRST EMPLOYED			DATE LAST EMPLOYED			TYPE EMPLOYMENT	VITAL STATUS	DATE OF DEATH OR DATE LAST OBSERVED			ARMED FORCES?	BIRTH PLACE	EMPL STATUS	MARITAL STATUS	HIGHEST ED LEVEL	EMPLOYEE NUMBER				UPDATE CODE	CARD TYPE																							
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	
NOTES																																																																																
COL 37 C=NAME CHANGED BLANK=OTHERWISE									COL 39 M=WHITE B=BLACK O=ORIENTAL I=AMERICAN INDIAN A=ALASKAN NATIVE AS=ASIAN/PACIFIC NATIVE S=SPANISH AMERICAN X=OTHER U=UNKNOWN									COL 47 B=BIRTHDATE ESTIMATED BLANK=OTHERWISE									COL 61 A=ALIVE D=DEAD U=UNKNOWN									COL 69-70 IF UNITED STATES USE STANDARD 2 LETTER CODE  M=MEXICO/PUERTO RICO X=OTHER U=UNKNOWN									COL 71 H=HOURLY ONLY S=SALARIED ONLY B=BOTH									COL 72 M=MARRIED S=SINGLE D=DIVORCED/JEP W=WIDOWED U=UNKNOWN									COL 73 D=DOCTORATE M=MASTERS B=BACHELORS A=ASSOCIATE DEGREE H=HIGH SCHOOL DEGREE OR LESS U=UNKNOWN									COL 79 BLANK=NEW C=CHANGE D=DELETE								
COL 36 C=SSCHANGED A=SSASSIGNED BLANK=OTHERWISE																											COL 68 Y=YES N=NO U=UNKNOWN																																																					

## JOB HISTORY

[illegible]

NOTES:	COL 501	COL 79
	H-HOURLY	BLANK=NEW
	E EXEMPT	C-CHANGE
	N NONEXEMPT	D=DELETE

7179

UCCNHT0000132

SAMPLE MORBIDITY QUESTIONNAIRE

NAME \_\_\_\_\_ (M.I.) \_\_\_\_\_ (LAST) \_\_\_\_\_

DATE OF BIRTH \_\_\_\_\_ SEX 1 - MALE 2 - FEMALE

RACE 1 - WHITE 2 - NON WHITE

JOB HISTORY

<u>COMPANY</u>	<u>POSITION</u>	<u>FROM (DATE)</u>	<u>TO (DATE)</u>
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

SMOKING HISTORY - CURRENT USE

<u>TYPE SMOKER</u>	<u>NO. OF CIGARETTES SMOKED</u>	<u>LENGTH OF TIME A SMOKER</u>
1 - Non Smoker	1 - None	1 - Never
2 - Cigarette	2 - < 1/2 pack per day	2 - < 5 years
3 - Pipe or Cigar Smoker	3 - 1/2 to 1 pack per day	3 - 5 to 10 years
4 - 2 and 3	4 - ≥ 1 pack per day	4 - ≥ 10 years

If you have stopped smoking, please answer following.

<u>HOW LONG SINCE QUIT</u>	<u>TYPE OF SMOKER</u>	<u>NO. OF CIGARETTES SMOKED</u>	<u>LENGTH OF TIME SPENT AS A SMOKER</u>
1 - < 1 year	1 - Cigarettes	1 - None	1 - < 5 years
2 - 1-5 years	2 - Cigars or pipe	2 - < 1/2 pk/day	2 - 5-10 years
3 - 5-10 years	3 - Combination	3 - 1/2 pk/day	3 - ≥ 10 years
4 - ≥ 10 years	4 - Cigars or pipe	4 - ≥ pk/day	

HEALTH HISTORY

Please list all significant diseases or conditions you have had since employment with Union Carbide.

<u>DISEASE OR CONDITION</u>	<u>DATE OF DIAGNOSIS</u>	<u>NAME AND ADDRESS OF ATTENDING PHYSICIAN</u>
-----------------------------	--------------------------	--

1.)

2.)

3.)

4.)

5.)

Please list all hospitalizations since employment with Union Carbide.

<u>DATE OF HOSPITALIZATION</u>	<u>NAME OF HOSPITAL</u>	<u>CITY, STATE</u>	<u>REASON FOR HOSPITALIZATION</u>	<u>PHYSICIAN</u>
------------------------------------	-----------------------------	------------------------	---------------------------------------	------------------

1.)

2.)

3.)

4.)

5.)

6.)

7.)

UCCNHT0000134